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JOINT CEMENT

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ABSTRACT OF THE DISCLOSURE

A wallboard joint cement comprising a major portion of a wallboard joint cement filler and a minor portion of a cement binder comprising between about 51 and 75% by weight of gelatinized oxidized starch material and between about 25 and 49% by weight of non-gelatinized starch material.

This invention is directed to compositions useful in wallboard joint cements and to a process for producing such cements.

A wallboard joint cement is used in dry wall construction to give a wall a continuous, finished appearance. In most dry wall construction pre-cut, rectangular sections of wallboard are fastened in abutting relation to a frame to form a substantially flat wall. The spaces or cracks unavoidably created by the abutting sections are then filled with a wet joint cement, allowed to dry, and sanded to give a smooth uniform appearance. A preferred mode of operation is to first fill the spaces or joints between the wallboard with a cement having an overlap spread of several inches. A perforated strip is then placed over the cement and additional cement applied. The cement is smoothed, allowed to dry, and then sanded to a smooth uniform appearance.

The joint cements most generally used are available as a dry mixture and comprise a major portion of an inert filler and a minor portion of a binder.

The filler portion of the cement is generally an inert material such as asbestos, mica, limestone, clay, silica and the like. Generally, two or more of the above materials are used with clay or limestone making up the major filler ingredient. The binder portion of the cement is the more important of the two and normally consists of a protein such as casein. Various animal glues, natural gums, and polymeric resins have also been used to some degree.

As previously mentioned, the joint cement is generally available as a dry mix. When the cement is to be used, it is mixed with water until the most desirable working consistency or viscosity is obtained. The particular cement consistency or viscosity depends on the personal preference of the user and on whether the cement will be manually or machine applied.

One of the disadvantages associated with the joint cements presently being used is that the joint cement tended to crack or form hairline splits along its surface during or a short time after the cement had dried and hardened. In some instances these cracks appeared after the wall had been painted or textured thus adding to the cost and complexity of repair. These surface cracks have been attributed to the differential movement of the tape, cement, or wallboard during the period of drying. However the major cause for cracking is attributed to shrinkage which occurs during the hardening or drying process.

Another disadvantage associated with joint cements now in use and particularly with joint cements which utilize casein as the binder is that, after the dry cement powder has been wetted with water, a waiting period of approximately one hour is required to insure complete dispersion of the casein in the water. Further, if the casein is not

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properly dispersed in the cement, lumping, poor adhesion, and cracking of the cement can occur. Still another problem associated with cement compositions presently being used is that the binder material in the cement has a tendency to migrate to the surface of the cement during the drying and hardening process. This causes crusting and excessive hardening of the surface layer and makes even sanding of the cemented area and the wallboard extremely difficult. Still another problem related to particle migration is surface discoloration. Discoloration of the cemented area is particularly prevalent in areas of high humidity and has been found to occur from several months to several years after the cement has been applied.

Particle migration, however, can be controlled if not remedied by mixing smaller amounts of water with the dry joint cement. For all practical purposes though, the amount of water added cannot be varied too much from what is considered a trowelable viscosity without effecting the ease and quality of cement application.

It is therefore an object of this invention to provide a cement which exhibits improved joint cement characteristics and which avoids the disadvantages associated with binding materials previously used in the art.

Another object of this invention is to provide a joint cement which has improved troweling characteristics and which exhibits improved adhesion to the wallboard.

Another object of this invention is to provide a dry joint cement which exhibits improved adhesion and sandability properties, and which exhibits an improved resistance to color bleeding and surface cracking.

Another object of this invention is to provide a binder composition for joint cements which is compatible and complementary with the filler portion of cement.

Still another object of this invention is to provide a dry joint cement having a binder which is economical and readily available on the open market.

A more particular object of this invention is to provide a wallboard joint cement having the following combined characteristics.

(1) Good adhesion to a wallboard and to a perforated tape.

(2) Resistance to color bleeding.

(3) Improved sandability.

(4) Good crack resistance.

(5) Low water demand in arriving at a trowelable viscosity.

(6) Long pot life.

(7) Negligible shrinkage of the dried and hardened cement.

These and other objects of this invention will be more readily apparent from the detailed description and discussion which follows.

It was unexpectedly found that these and other objects of this invention can be accomplished by utilizing a particular type of starch material as a binder in the joint cement. The starch material used as a binder in the composition of this invention may be broadly described as gelatinized, oxidized starch capable of exhibiting binding characteristics in a cement filler.

Oxidized starches may be obtained by a number of oxidizing techniques whereby a starch material is contacted with an oxidizing agent under oxidizing conditions.

For example, the oxidation of a starch material may be accomplished by the use of hydrogen peroxide; hypochlorites; periodic acid; α , α' bis (azobutyronitrile); potassium persulfate; and many others. A more complete discussion on the oxidation of starches can be found in Kerr's "Chemistry and Industry of Starch," 2nd edition, 1950, pages 325-343.

Although the techniques employed in oxidizing starches